5-24-01

JC03 Rec'd PCT/PTO 23 MAY 2001

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		Attorney's Docket Number 70140
		U.S. Application No. (if known, see 37 C.F.R. 1.5) 09/856788
INTERNATIONAL APPLICATION NO. PCT/EP99/07756	INTERNATIONAL FILING DATE October 14, 1999	PRIORITY DATE CLAIMED 23/Nov./1998
TITLE OF INVENTION SHIELDING DEVICE FOR CONNECTION STRIPS IN TELECOMMUNICATIONS AND DATA ENGINEERING		
APPLICANT(S) FOR DO/EO/US BIPPUS et al.		

Applicant h... ...the United States Designated/Elected Office (DO/EO/US) the following items and other information Please correct the title on the data sheet to match the I.A.

1. [X] ...g under 35 U.S.C. 371.
2. [ ] ...tems concerning a filing under 35 U.S.C. 371.
3. [X] ...rocedures (35 U.S.C. 371(f) at any time rather than delay ...e limit set in 35 U.S.C. 371(b) and PCT Articles 22 and
4. [X] ...ination was made by the 19th month from the earliest

5. [X] A copy of the International Application as filed (...S.C. 371(C)(2))
   a. [ ] is transmitted herewith (required only If not transmitted by the International Bureau).
   b. [X] has been transmitted by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [X] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [ ] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] have been transmitted by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. [ ] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other documents (s) or information included:

11. [X] An Information Disclosure Statement under 37 CFR 1.97 and 1.98
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment.
    [ ] A SECOND or SUBSEQUENT preliminary amendment.
14. [X] A substitute specification.
15. [ ] A change of power of attorney and/or address letter.
16. [X] Other items or information:
    Formal Drawings (4 sheets)
    Copy of Express Mail Receipt No. EL151019525US
    Copies of Cited References (5)
    Marked Up Copy of the Translation

U.S. Appln No. (if known, see 37 CFR 1.5) 09/856788	International Application No. PCT/EP99/07756	Attorney's Docket Number 70140

17. [X] The following fees are submitted: **BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):**	CALCULATIONS	PTO USE ONLY
Search Report has been prepared by the EPO or JPO $860.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) $690.00		
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) $710.00		
Neither international preliminary examination fee (37 CFR 1.482 nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO $1,000.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) $100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 860.00	
Surcharge of $130.00 for furnishing the oath or declaration later than [ ]20 [ ]30 months from the earliest claimed priority date (37 CFR 1.492(e))	$ 860.00	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	6 - 20 =	0	X $ 18.00	$ 0.00	
Independent claims	3 - 3 =	0	X $ 80.00	$ 0.00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $270.00	$ 0.00	
TOTAL OF ABOVE CALCULATIONS =				$ 860.00	

Reduction of ½ for filing small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1,28)	$	
SUBTOTAL =	$ 860.00	
Processing fee of $130.00 for furnishing the English translation late than [ ]20 [ ]30 months from the earliest claimed priority date (37 CFR 1.492(f)). +	$ 0.00	
TOTAL NATIONAL FEE =	$ 860.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +	$ 0.00	
TOTAL FEES ENCLOSED =	$ 860.00	
	Amount to be: refunded	$
	charged	$

a. [X] A check in the amount of $ 860.00 to cover the above fees is enclosed.

b. [ ] Please charge my Deposit Account No. 13-0410 in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 13.0410. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

Send all correspondence to:

McGLEW AND TUTTLE, P.C.
Scarborough Station
Scarborough, NY 10510-0827

Signature

John James McGlew
Name

31,903
Registration Number

05-24-01

PCT

09/856788

JC18 Rec'd PCT/PTO 23 MAY 2001

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REGISTERED PA... PATENT TRADEMARK COPYRIGHT, AND UNFAIR COMPETITION CAUSES

JOHN JAMES M... ...D.C. BARS

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KRISTINA M. GRASSO, PATENT AGENT

Hon. Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Re: ATTORNEY DOCKET: 70140
Customer Number: 000023872

Sir:

Attached please find the complete application papers and Large Entity fees in the above-identified application which are being placed in the U.S. Mail today, May 23, 2001, as Express Mail number EL151019525US.

A copy of the Express Mail receipt is also attached.

Respectfully submitted
for Applicant(s),

By: _____
John James McGlew
Reg. No. 31,903

JJM:tf
Enclosures - Complete Application Papers and Fees
- Copy of Express Mail Receipt

DATED: May 23, 2001
SCARBOROUGH STATION
SCARBOROUGH, NEW YORK 10510-0827
(914) 941-5600

I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE AS EXPRESS MAIL IN AN ENVELOPE ADDRESSED TO: COMMISSIONER OF PATENTS AND TRADEMARKS, WASHINGTON, D.C. 20231, NO. EL151019525US

McGLEW AND TUTTLE, P.C., SCARBOROUGH STATION, SCARBOROUGH, NEW YORK 10510-0827

BY: _____ DATE: May 23, 2001

70140.6

ATTORNEY DOCKET NO: 70140

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : BIPPUS et al.
PCT No : PCT/EP99/07756
Filed : May 22, 2001
For : SHIELDING DEVICE...
Dated : May 23, 2001

Hon. Commissioner of Patents
and Trademarks
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Prior to initial examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Please replace the specification originally filed, with the enclosed substitute specification. A marked up copy of the original specification is attached. Applicant states that no new matter has been added.

IN THE CLAIMS:

Please cancel claims 1 to 6 without prejudice and replace them with the following new claims:

7. (New) A shielding device for connection strips for telecommunications and data engineering applications, the shielding device comprising:

a plurality of shielding plates;

at least one base rail, said shielding plates and said base rail being integrally formed from a metal sheet with each shielding plate connected to the base rail via a narrow web, each of said said shielding plates being arranged rotated through approximately 90° with respect to the base rail.

8. (New) A shielding device as claimed in claim 7, wherein spacings between adjacent shielding plates may be varied by providing folds in the base rail.

9. (New) A process of producing a shielding device for connection strips in telecommunications and data engineering applications, the process comprising the steps of:

providing a metal sheet;

forming a number of shielding plates, a base rail supporting the shielding plates, and webs connecting the respective shielding plates to the base rail integrally from the metal sheet;

subsequently rotating the shielding plates in the region of the webs through approximately 90° with respect to the base rail.

10. (New) The process as claimed in claim 9, wherein a spacing between adjacent shielding plates may be changed by folding the base rail in a region between said adjacent shielding plates.

11. (New) The process according to claim 9, further comprising the steps of:

disposing said base rail and said integrally formed shielding plates rotated through 90° with respect to said base rail as shielding inside a connection strip; and

using the connection strip with said base rail and said integrally formed shielding plates rotated through 90° with respect to said base rail for high transmission rates in telecommunications and data transmission applications.

12. (New) A connection strip, comprising:

a plastic housing;

insulation-piercing terminal contact elements arranged in said plastic housing;

shielding plates arranged between said insulation-piercing terminal contact elements; and

at least one ground rail connected to said shielding plates, said shielding plates and said base rail being integrally formed from a metal sheet with each shielding plate being connected to said base rail via a web and being arranged rotated approximately 90° with respect to said base rail.

REMARKS

Claims 7 through 12 are in this application and are presented for consideration. Claims 1 through 6 have been canceled. The new claims present subject matter similar to the original claims, but in a different form.

The specification and claims have been amended in order to place this application in better form. The reference to claims in the specification has been deleted or amended.

Appropriate headings have been added. No new matter has been added.

Favorable action on the merits is respectfully requested.

Respectfully submitted
for Applicant,

By: _____

John James McGlew
Registration No. 31,903
McGLEW AND TUTTLE, P.C.

JJM:jj/tf
70140.1

Enclosed: Substitute Specification and Marked up copy of Translation

DATED: May 23, 2001
SCARBOROUGH STATION
SCARBOROUGH, NEW YORK 10510-0827
(914) 941-5600

SHOULD ANY OTHER FEE BE REQUIRED, THE PATENT AND TRADEMARK OFFICE IS HEREBY REQUESTED TO CHARGE SUCH FEE TO OUR DEPOSIT ACCOUNT 13-0410.

I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE AS EXPRESS MAIL IN AN ENVELOPE ADDRESSED TO: COMMISSIONER OF PATENTS AND TRADEMARKS, WASHINGTON, D.C. 20231, NO.: EL151019525US

McGLEW AND TUTTLE, P.C.
SCARBOROUGH STATION, SCARBOROUGH, NY 10510-0827

BY: _____ DATE: May 23, 2001

KRONE AKTIENGESELLSCHAFT, Beeskowdamm 3-11
14167 Berlin

Shielding device for connection strips in telecommunications and data engineering

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The invention relates to a shielding device for connection strips in telecommunications and data engineering, comprising a number of shielding plates and at least one base rail allocated to the latter.

A shielding device of the generic type is already known from the connection strip disclosed in US 5,160,273. Here, the problem of crosstalk between adjacent insulation-piercing terminal contact elements of the connection strip is solved by the insertion of a multiplicity of electrically conductive shielding plates between the individual pairs of insulation-piercing terminal contact elements. The problem of crosstalk occurs when transmitting large volumes of information via electrical lines, the information being transmitted at high frequencies. Transmitting at high frequencies produces radiation and interference between adjacent lines, particularly when these lines are arranged close beside one another in the connection strip. Electrically conductive shielding plates are inserted between a pair of insulation-piercing terminal contact elements, the spacing between two adjacent pairs of insulation-piercing terminal contact elements being larger than the spacing between adjacent insulation-piercing terminal contact elements in a pair. The shielding plates are in this case inserted

between pairs of insulation-piercing terminal contact elements in slots which extend transversely to the longitudinal direction of the plastic body of the connection strip, and contact the base rail situated in the longitudinal direction inside the plastic body. A disadvantage of this is that, when fitting the component into the plastic body, it is first necessary to fit the base rail, which has contact tongues for contacting the individual shielding plates, and that it is subsequently necessary to push the individual shielding plates into the connection strip. Consequently, the complexity of assembly is relatively high in order to provide the connection strip with the shielding device for high transmission rates in telecommunications and data engineering.

The invention is therefore based on the object of improving the shielding device of the generic type in order to simplify assembly.

To achieve this object, the invention provides for the shielding plates and the base rail to be integrally formed from a metal plate, and for each shielding plate to be connected to the base rail via a narrow web and arranged rotated through approximately 90° with respect to the base rail. The shielding device according to the invention thus forms an integral component which is made of metallic material and which, during assembly of a connection strip for telecommunications and data engineering, is inserted into the plastic housing of the connection strip with its base rail, and its shielding plates, which are integrally connected to the base rail, are guided into all the preformed slots inside the connection strip at the same time. This simplifies assembly considerably.

In a further embodiment of the invention, the spacings between the shielding plates on a base rail may be designed to be different from one another. This enables a shielding plate to be matched to different applications.

The invention also relates to a method of producing the shielding device in accordance with patent claim 3, to a connection strip for the shielding device in accordance with patent claim 5, and finally to the use of the shielding device inside a connection strip in accordance with claim 6.

The invention is explained in more detail below with the aid of an exemplary embodiment of a shielding device which can be fitted, or is fitted, into a connection strip for telecommunications and data engineering. This exemplary embodiment is illustrated in more detail in the drawings, in which:

Figure 1 shows a perspective illustration of the shielding device,

Figure 2 shows a front view,

Figure 3 shows a plan view,

Figure 4 shows a plan view of a metal sheet having punched-out shielding plates and the base rail,

Figure 5 shows an illustration, corresponding to Figure 4, of a part of the shielding device having a folded base rail,

Figure 6 shows a side view of a connection strip,

Figure 7 shows a cross section along the line A-A in Figure 6,

Figure 8 shows a plan view of the connection strip shown in Figure 6, and

Figure 9 shows a cross section along the line B-B in Figure 8.

In the exemplary embodiment, the shielding device 1 comprises seven flat, essentially U-shaped shielding plates 2, a base rail 3 and seven connection webs 4, which connect the individual shielding plates 2 to the base rail 3. The shielding device 1 is made of conductive metallic material and is integrally formed, in particular punched, with the shielding plates 2, the base rail 3, and the connection webs 4, from a metal sheet 28, particularly copper, copper alloys, steel or aluminum, the shielding plates 2 and the base rail 3

with the connection webs 4 initially lying in the same plane as the metal sheet 28. In a work step which follows the cutting-out process, the individual shielding plates 2 are rotated in the region of their connection webs 4 through 90° with respect to the base rail 3. A hole 5 in the base rail 3 is associated with each shielding plate 2 close to the connection web 4, and this hole 5 is used for adjustment during the production process. The metal sheet 28 may also be a metalized plastic strip or the like.

In the view of how the shielding device 1 is processed, shown in Figure 4, the individual shielding plates 2 are of U-shaped design, a roughly rectangular shielding panel 6 adjoining the connection web 4 and being provided with two prong-like shielding forks 7 at the end remote from the connection web 4. These shielding forks 7 are stepped by means of a shoulder 8 which tapers the cross section so that they are matched to the internal cross section of the connection strip 11.

Figure 4 shows the metal sheet 28 with cut-out or punched-out shielding plates 2 of width B with a mean spacing X between one another and with the cut-out or punched-out base rail 3 with the holes 5 which are used for adjustment during production. The length of the metal sheet 28 corresponds to the number of shielding plates 2 of width B plus the cut gaps.

Figure 5 shows the shielding plates 2 which are rotated through 90° with respect to the base rail 3 and are normally at a distance X from one another. To achieve a shorter distance X', a fold 9 is introduced into the base rail 3, as shown in Figure 8.

The shielding device 1 is used for shielding the individual insulation-piercing terminal contact elements 10 inside a connection strip 11 for high transmission rates in telecommunications and data engineering. Such a connection strip 11 having a plurality of insulation-piercing terminal contact elements 10 arranged in pairs is illustrated and

described in more detail in DE 43 25 952 C2. The connection strip 11 is illustrated in Figures 6 to 9 and is described in more detail below with respect to the shielding device 1 used.

The connection strip 11 comprises a plastic housing 12 made of an upper part 13 and a lower part 14 which are latched to one another by means of latching openings 15 in the upper part 13 and latching lugs 16 in the lower part 14. Terminal slots 17 are formed in the upper part 13 and have integrally formed terminal lugs 18 and terminal webs 19 which serve to hold the insulation-piercing terminal contact elements 10. The latter are formed from sheet-like flat material and comprise two contact webs 21 enclosing a contact slot 20 between them. A base web 22 is adjoined by contact fingers 23 which merge into spring contacts 24. Two pairs of insulation-piercing terminal contact elements 10 are respectively arranged close beside one another, the spacing D between two adjacent pairs of insulation-piercing terminal contact elements 10 being considerably larger than the spacing d between insulation-piercing terminal contact elements 10 which are close beside one another, as can be seen in Figure 6. The individual shielding plates 2 of the shielding device 1 are inserted into the total of seven wider cross-sectional regions 25 of the connection strip 11, as shown by dashed lines in Figures 6 and 7 and by solid lines in Figures 8 and 9.

To insert the base rail 3 with the individual shielding plates 2 into the housing 12 of the connection strip 11, the upper part 13 in the exemplary embodiment contains seven chambers 26 with respective transverse slots 27 into which the individual shielding plates 2 are pushed. The base rail 3 is situated in a longitudinal slot 21 in the bottom region of the lower part 14, as shown in Figures 7 and 9. The shielding panels 6 and shielding forks 7, which adjoin the latter, of the individual shielding plates 2 essentially take up the whole of the cross section of

the interior of the connection strip 11, as shown in Figure 9 in particular, and thus separate the individual pairs of insulation-piercing terminal contact elements 10 in such a manner that greater crosstalk attenuation is achieved for high transmission rates as a result of the electrically conductive shielding plates 2. The use of the large-area electrically conductive shielding plates 2 in the connection strip 11 does not require the physical volume of the connection strip to be enlarged, nor any greater expense to produce it.

The shielding device 1 does not require any grounding. It is important only that the individual shielding plates 2 are conductively connected to one another. This is achieved by means of the base rail 3, which is common to all the shielding plates 2. The shielding plates 2 influence the electrical field in such a way that the influence charging of an insulation-piercing terminal contact element 10 is reduced in the adjacent insulation-piercing terminal contact element 10, and the interference voltage is thus small. This produces a relatively high signal-to-noise ratio. The signal-to-noise ratio becomes higher, with the result that higher frequencies can be transmitted without the adjacent lines of the insulation-piercing terminal contact elements 10 having an adverse effect on one another.

The number of shielding plates 2 in a shielding device 1 depends on the number of pairs of insulation-piercing terminal contact elements 10. In the exemplary embodiment, an 8-pair module is illustrated, which has seven chambers 26 for a total of seven shielding plates 2. Common pairings are 4/3, 8/7, 10/9, 12/11, 16/15, 20/19, 24/23 and 25/24, where the number of pairs of insulation-piercing terminal contact elements 10 and the number of shielding plates 2 are indicated in each case.

For a HIGHBAND 8 connection strip 11, the standard spacing X between the shielding plates 2 is

X = 12.6 mm. However, for a HIGHBAND 10 connection strip 11, for example, the spacing is X' = 9.6 mm. For this, the folds 9 are introduced into the base rail 3 between each of the individual shielding plates 2. This spacing cannot be achieved by directly punching the shielding device 1 out of a metal sheet 28, since the width B of the individual shielding plate 2 needs to be around 12 mm on account of the width of the connection strip 11. Hence, for a HIGHBAND 8 connection strip 11, the dimensions width B = 12.6 mm and spacing X = 12.6 mm complement one another well. For a narrower spacing X', however, folds 9 are necessary; these may be replaced by any other kind of means for shortening the length of the base rail 3.

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Nov. 18, 1998
(98-025 DE)

PATENT CLAIMS

1. A shielding device for connection strips in telecommunications and data engineering, comprising a number of shielding plates and at least one base rail allocated to the latter, wherein the shielding plates (2) and the base rail (3) are integrally formed from a metal sheet (28), and wherein each shielding plate (2) is connected to the base rail (3) via a narrow web (4) and is arranged rotated through approximately 90° with respect to the base rail (3).

2. The shielding device as claimed in claim 1, wherein the spacings (X, X') between the shielding plates (2) can be designed differently, particularly by means of folds (9) in the base rail (3).

3. A method of producing a shielding device for connection strips in telecommunications and data engineering as claimed in claim 1 or 2, wherein a number of shielding plates (2) and a base rail (3) supporting the latter, as well as webs (4) connecting the shielding plates (2) to the base rail (3), are integrally formed from a metal sheet (28), and the shielding plates (2) are subsequently rotated in the region of the webs (4) through approximately 90° with respect to the base rail (3).

4. The method as claimed in claim 3, wherein the spacings (X, X') between the shielding plates (2) can be designed differently, particularly by means of folds (9) in the base rail (3).

5. A connection strip for telecommunications and data engineering, having insulation-piercing terminal contact elements arranged in a plastic housing, and shielding plates arranged between said insulation-

piercing terminal contact elements, and at least one ground rail allocated to said shielding plates, wherein the shielding plates (2) and the base rail (3) are integrally formed from a metal sheet (28), and wherein each shielding plate (2) is connected to the base rail (3) via a narrow web (4) and is arranged rotated through 90° with respect to the base rail (3).

6. The use of a shielding device (1), comprising a base rail (3) and shielding plates (2) which are integrally formed on the latter and are rotated through 90° with respect to the base rail (3), as shielding inside a connection strip (11) for high transmission rates in telecommunications and data engineering.

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Nov. 18, 1998
(98-025 DE)

A B S T R A C T

The invention relates to a shielding device for connection strips in telecommunications and data engineering, comprising a number of shielding plates and at least one base rail allocated to the latter. To simplify the process of fitting the shielding device inside a connection strip, the shielding plates (2) and the base rail (3) are integrally formed from a metal sheet (28), and each shielding plate (2) is connected to the base rail (3) via a narrow web (4) and is arranged rotated through approximately 90° with respect to the base rail (3). (Fig. 1)

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Nov. 18, 1998
(98-025 DE)

L I S T O F R E F E R E N C E N U M E R A L S

1	Shielding device
2	Shielding plate
3	Base rail
4	Web
5	Hole
6	Shielding panel
7	Shielding fork
8	Shoulder
9	Fold
10	Insulation-piercing terminal contact elements
11	Connection strip
12	Plastic housing
13	Upper part
14	Lower part
15	Latching opening
16	Latching lug
17	Terminal slot
18	Terminal lug
19	Terminal web
20	Contact leg
21	Longitudinal slot
22	Base web
23	Contact finger
24	Spring contact
25	Cross-sectional region
26	Chamber
27	Transverse slot
28	Metal sheet

Docket # 70140

SHIELDING DEVICE FOR CONNECTION STRIPS IN TELECOMMUNICATIONS AND DATA ENGINEERING

FIELD OF THE INVENTION

The invention relates to a shielding device for connection strips in telecommunications and data engineering, comprising a number of shielding plates and at least one base rail allocated to the latter.

BACKGROUND OF THE INVENTION

A shielding device of the generic type is already known from the connection strip disclosed in US 5,160,273. Here, the problem of crosstalk between adjacent

insulation-piercing terminal contact elements of the connection strip is solved by the insertion of a multiplicity of electrically conductive shielding plates between the individual pairs of insulation-piercing terminal contact elements. The problem of crosstalk occurs when transmitting large volumes of information via electrical lines, the information being transmitted at high frequencies. Transmitting at high frequencies produces radiation and interference between adjacent lines, particularly when these lines are arranged close beside one another in the connection strip. Electrically conductive shielding plates are inserted between a pair of insulation-piercing terminal contact elements, the spacing between two adjacent pairs of insulation-piercing terminal contact elements being larger than the spacing between adjacent insulation-piercing terminal contact elements in a pair. The shielding plates are in this case inserted between pairs of insulation-piercing terminal contact elements in slots which extend transversely to the longitudinal direction of the plastic body of the connection strip, and contact the base rail situated in the longitudinal direction inside the plastic body. A disadvantage of this is that, when fitting the component into the plastic body, it is first necessary to fit the base rail, which has contact tongues for contacting the individual shielding plates, and that it is subsequently necessary to push the individual shielding plates into the connection strip. Consequently, the complexity of assembly is relatively high in order to provide the connection strip with the shielding device for high transmission rates in telecommunications and data engineering.

SUMMARY AND OBJECTS OF THE INVENTION

The invention is therefore based on the object of improving the shielding device of the generic type in order to simplify assembly.

To achieve this object, the invention provides for the shielding plates and the base rail to be integrally formed from a metal plate, and for each shielding plate to be connected to the base rail via a narrow web and arranged rotated through approximately 90° with respect to the base rail. The shielding device according to the invention thus forms an integral component which is made of metallic material and which, during assembly of a connection strip for telecommunications and data engineering, is inserted into the plastic housing of the connection strip with its base rail, and its shielding plates, which are integrally connected to the base rail, are guided into all the preformed slots inside the connection strip at the same time. This simplifies assembly considerably.

In a further embodiment of the invention, the spacings between the shielding plates on a base rail may be designed to be different from one another. This enables a shielding plate to be matched to different applications.

The invention also relates to a method of producing the shielding device wherein a number of shielding plates and a base rail supporting the latter, as well as webs connecting the shielding plates to the base rail, are integrally formed from a metal sheet. The shielding plates are subsequently rotated in the region of the webs through approximately 90° with respect to the base rail.

According to a further aspect of the invention, a connection strip is provided for

telecommunications and data engineering. The connection strip has insulation-piercing terminal contact elements arranged in a plastic housing, and shielding plates arranged between said insulation-piercing terminal contact elements. At least one ground rail is allocated to the shielding plates. The shielding plates and the base rail are integrally formed from a metal sheet. Each shielding plate is connected to the base rail via a narrow web and is arranged rotated through 90° with respect to the base rail.

According to still another aspect of the invention, a process for using a shielding device comprising a base rail and shielding plates is provided wherein the shielding plates are integrally formed on the base rail and are rotated through 90° with respect to the base rail. The device si used as a shielding inside a connection strip for high transmission rates in telecommunications and data engineering applications.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its uses, reference is made to the accompanying drawings and descriptive matter in which a preferred embodiment of the invention is illustrated.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

Figure 1 is a perspective illustration of the shielding device;

Figure 2 is a front view of the device of Figure 1;

Figure 3 is a plan view of the device of Figure 1;

Figure 4 is a plan view of a metal sheet having punched-out shielding plates and the base rail;

Figure 5 is a perspective illustration, corresponding to Figure 4, of a part of the shielding device having a folded base rail;

Figure 6 is a side view of a connection strip;

Figure 7 is a cross sectional view along the line A-A in Figure 6;

Figure 8 is a plan view of the connection strip shown in Figure 6; and

Figure 9 is a cross sectional view along the line B-B in Figure 8.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings in particular, in the exemplary embodiment, the shielding device 1 comprises seven flat, essentially U-shaped shielding plates 2, a base rail 3 and seven connection webs 4, which connect the individual shielding plates 2 to the base rail 3. The shielding device 1 is made of conductive metallic material and is integrally formed, in particular punched, with the shielding plates 2, the base rail 3, and the connection webs 4, from a metal sheet 28. The sheet metal 28 is particularly copper, copper alloys, steel or aluminum. The shielding plates 2 and the base rail 3 with the connection webs 4 are initially in the same plane as the metal sheet 28 (as shown in Figure 4). In a work step which follows the cutting-out process, the individual shielding plates 2 are rotated in the region of their 5 connection webs 4 through 90° with respect to the base rail 3. A hole 5 in the base rail 3 is associated with each shielding plate 2 close to the connection web 4, and this hole 5 is used for adjustment during

the 4 production process. The metal sheet 28 may also be a metalized plastic strip or the like.

In the view of how the shielding device 1 is processed, shown in Figure 4, the individual shielding plates 2 are of U-shaped design, a roughly rectangular shielding panel 6 adjoining the connection web 4 and being provided with two prong-like shielding forks 7 at the end remote from the connection web 4. These shielding forks 7 are stepped by means of a shoulder 8 which tapers the cross section so that they are matched to the internal cross section of the connection strip 11.

Figure 4 shows the metal sheet 28 with cut-out or punched-out shielding plates 2 of width B with a mean spacing X between one another and with the cut-out or punched-out base rail 3 with the holes 5 which are used for adjustment during production. The length of the metal sheet 28 corresponds to the number of shielding plates 2 of width B plus the cut gaps.

Figure 5 shows the shielding plates 2 which are rotated through 90° with respect to the base rail 3 and are normally at a distance X from one another. To achieve a shorter distance X', a fold 9 is introduced into the base rail 3, as shown in Figure 8.

The shielding device 1 is used for shielding the individual insulation-piercing terminal contact elements 10 inside a connection strip 11 for high transmission rates in telecommunications and data engineering. Such a connection strip 11, having a plurality of insulation-piercing terminal contact elements 10 arranged in pairs, is illustrated and described in more detail in DE 43 25 952 C2 (and in US 5,494,461). US 5,494,461 is hereby incorporated by reference. The connection strip 11 is illustrated in Figures 6 to 9 and is described in more detail below with respect to the shielding device 1 used.

The connection strip 11 comprises a plastic housing 12 made of an upper part 13 and a lower part 14 which are latched to one another by means of latching openings 15 in the upper part 13 and latching lugs 16 in the lower part 14. Terminal slots 17 are formed in the upper part 13 and have integrally formed terminal lugs 18 and terminal webs 19 which serve to hold the insulation-piercing terminal contact elements 10. The latter are formed from sheet-like flat material and comprise two contact webs 21 enclosing a contact slot 20 between them. A base web 22 is adjoined by contact fingers 23 which merge into spring contacts 24. Two pairs of insulation-piercing terminal contact elements 10 are respectively arranged close beside one another, the spacing D between two adjacent pairs of insulation- piercing terminal contact elements 10 being considerably larger than the spacing d between insulation-piercing terminal contact elements 10 which are close beside one another, as can be seen in Figure 6. The individual shielding plates 2 of the shielding device 1 are inserted into the total of seven wider cross-sectional regions 25 of the connection strip 11, as shown by dashed lines in Figures 6 and 7 and by solid lines in Figures 8 and 9.

To insert the base rail 3 with the individual shielding plates 2 into the housing 12 of the connection strip 11, the upper part 13 in the exemplary embodiment contains seven chambers 26 with respective transverse slots 27 into which the individual shielding plates 2 are pushed. The base rail 3 is situated in a longitudinal slot 21 in the bottom region of the lower part 14, as shown in Figures 7 and 9. The shielding panels 6 and shielding forks 7, which adjoin the latter, of the individual shielding plates 2 essentially take up the whole of the cross section of the interior of the connection strip 11, as shown in Figure 9 in particular, and thus separate the

individual pairs of insulation-piercing terminal contact elements 10 in such a manner that greater crosstalk attenuation is achieved for high transmission rates as a result of the electrically conductive shielding plates 2. The use of the large-area electrically conductive shielding plates 2 in the connection strip 11 does not require the physical volume of the connection strip to be enlarged, nor any greater expense to produce it.

The shielding device 1 does not require any grounding. It is important only that the individual shielding plates 2 are conductively connected to one another. This is achieved by means of the base rail 3, which is common to all the shielding plates 2. The shielding plates 2 influence the electrical field in such a way that the influence charging of an insulation-piercing terminal contact element 10 is reduced in the adjacent insulation-piercing terminal contact element 10, and the interference voltage is thus small. This produces a relatively high signal-to-noise ratio. The signal-to-noise ratio becomes higher, with the result that higher frequencies can be transmitted without the adjacent lines of the insulation-piercing terminal contact elements 10 having an adverse effect on one another.

The number of shielding plates 2 in a shielding device 1 depends on the number of pairs of insulation-piercing terminal contact elements 10. In the exemplary embodiment, an 8-pair module is illustrated, which has seven chambers 26 for a total of seven shielding plates 2. Common pairings are 4/3, 8/7, 10/9, 12/11, 16/15, 20/19, 24/23 and 25/24, where the number of pairs of insulation-piercing terminal contact elements 10 and the number of shielding plates 2 are indicated in each case.

For a HIGHBAND® brand 8 connection strip 11, the standard spacing X between the

shielding plates 2 is X = 12.6 mm. However, for a HIGHBAND® brand 10 connection strip 11, for example, the spacing is X' = 9.6 mm. For this, the folds 9 are introduced into the base rail 3 between each of the individual shielding plates 2. This spacing cannot be achieved by directly punching the shielding device 1 out of a metal sheet 28, since the width B of the individual shielding plate 2 needs to be around 12 mm on account of the width of the connection strip 11. Hence, for a HIGHBAND® brand 8 connection strip 11, 10 the dimensions width B = 12.6 mm and spacing X = 12.6 mm complement one another well. For a narrower spacing X', however, folds 9 are necessary; these may be replaced by any other kind of means for shortening the length of the base rail 3.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

ABSTRACT OF THE DISCLOSURE

A shielding device for connection strips in telecommunications and data engineering has a number of shielding plates and at least one base rail allocated to the shielding plates. To simplify the process of fitting the shielding device inside a connection strip, the shielding plates (2) and the base rail (3) are integrally formed from a metal sheet (28), and each shielding plate (2) is connected to the base rail (3) via a narrow web (4) and is arranged rotated through approximately 90° with respect to the base rail (3).

FIG.1

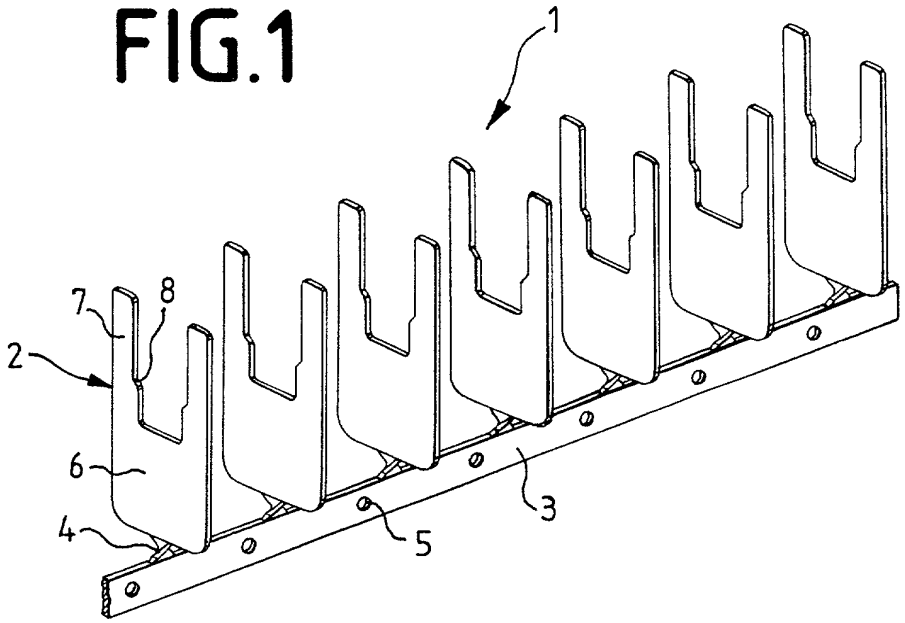


FIG.2

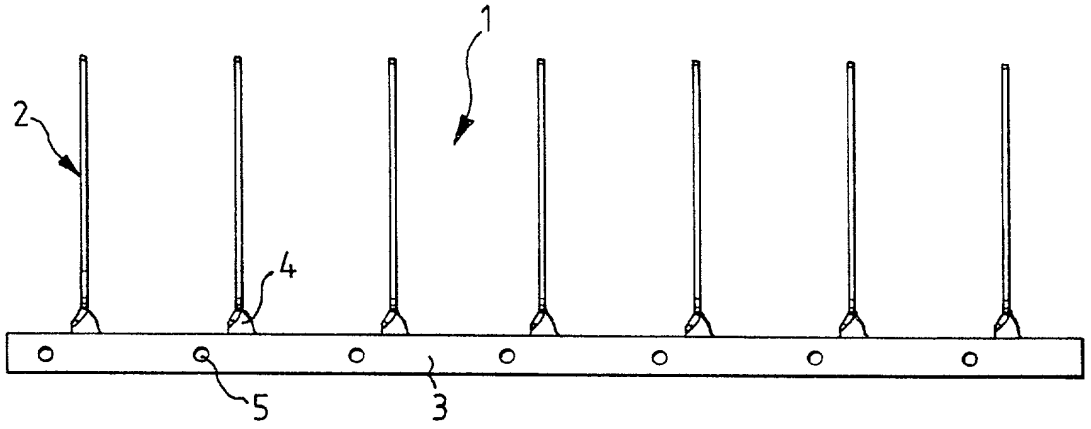


FIG.3

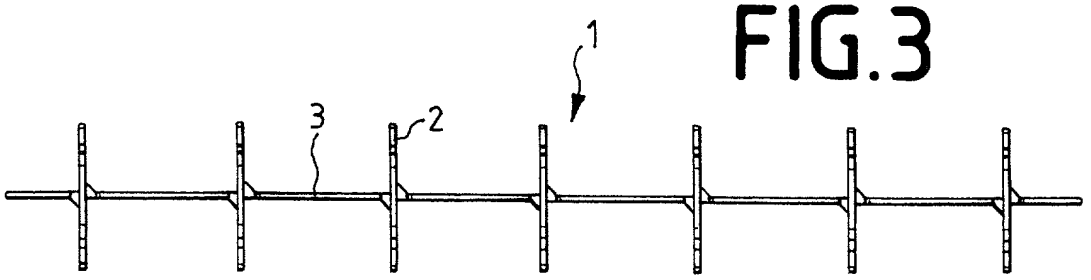


FIG.4

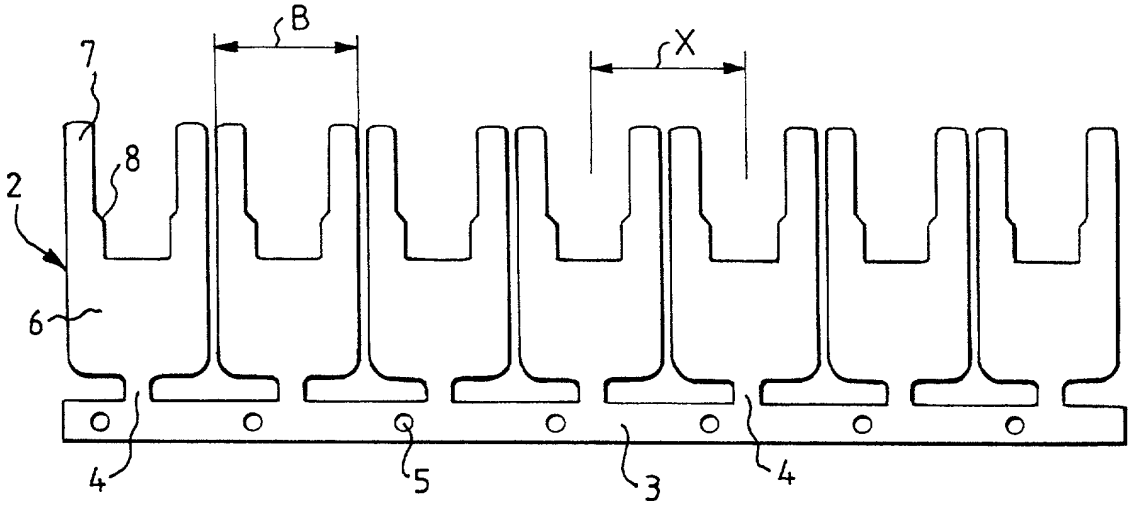


FIG.5

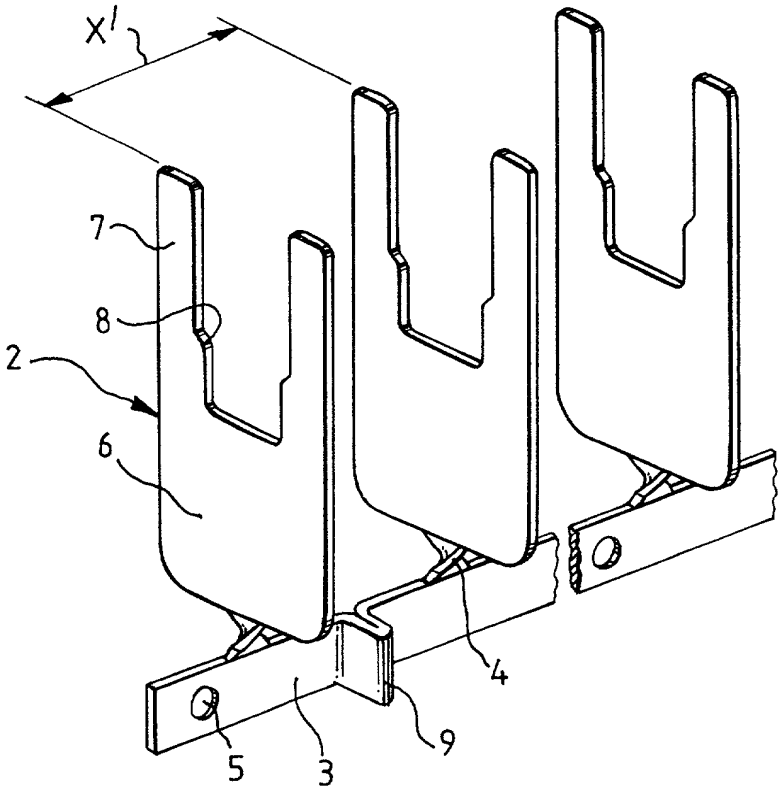
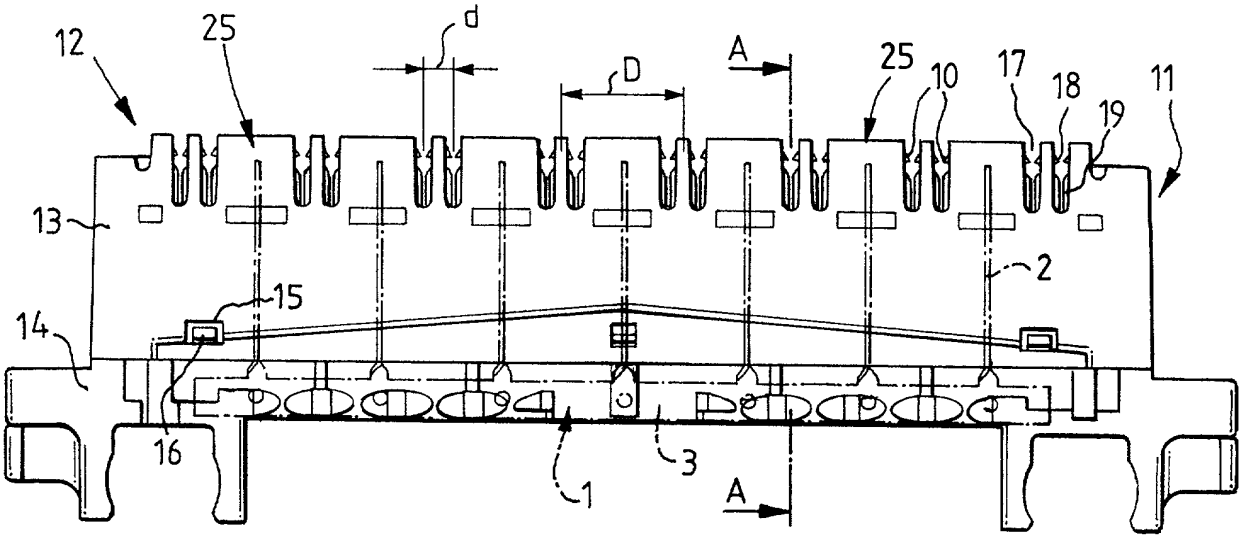


FIG.6


12
25
d
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25
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17
18
19
11
13
2
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14
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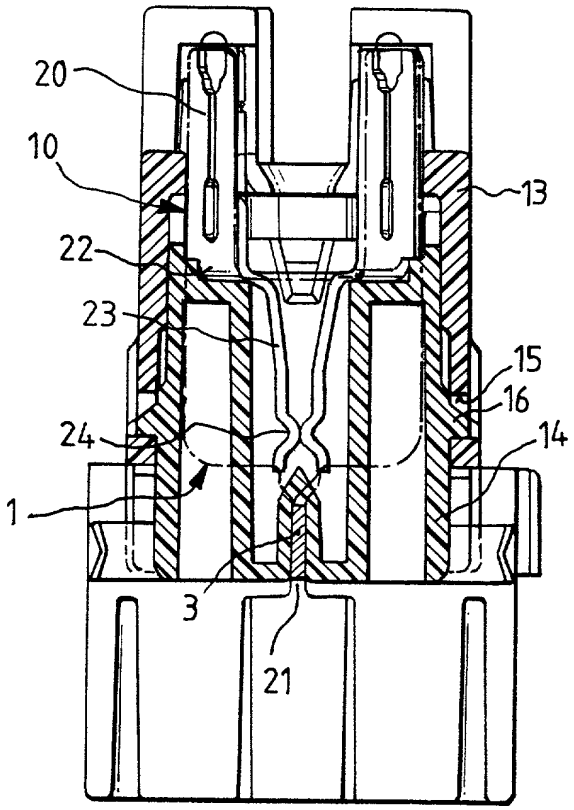
3
A

FIG.7


20
10
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22
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09/856788

FIG.8

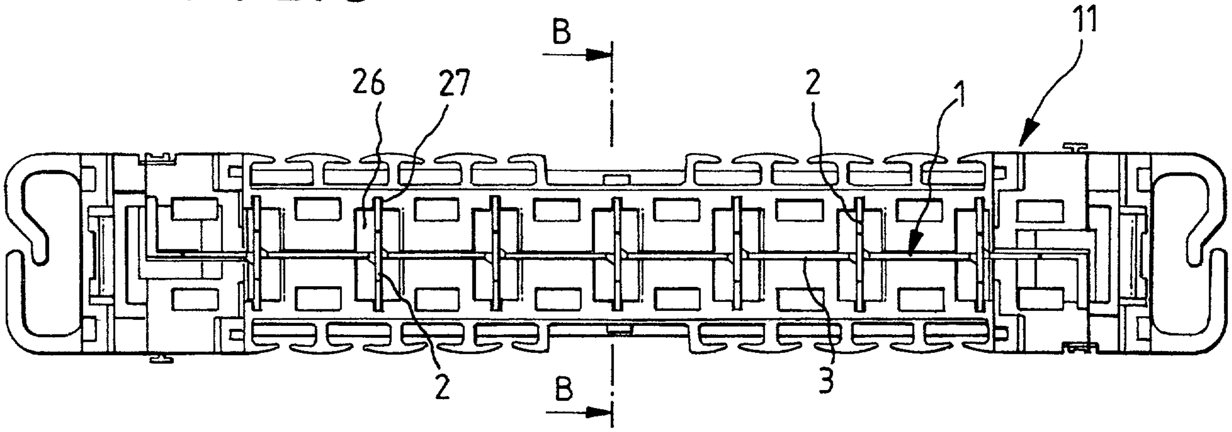
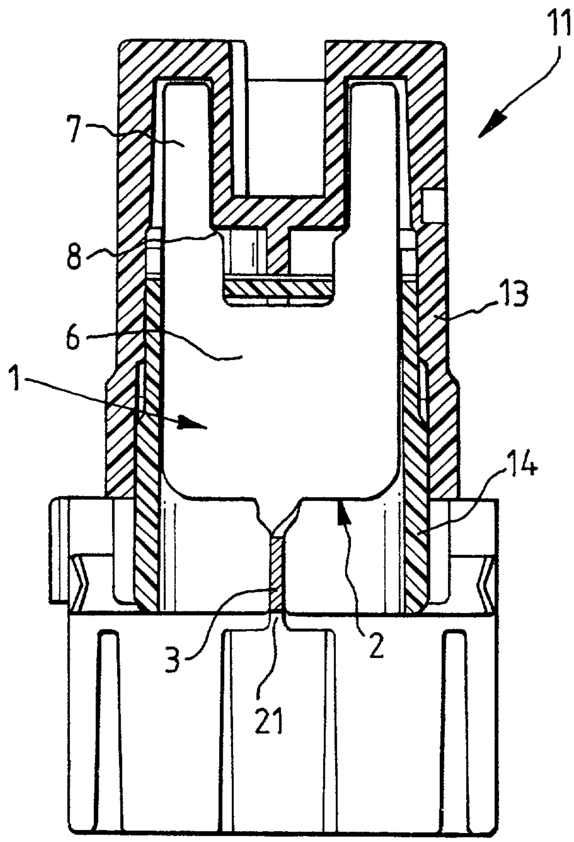


FIG.9



DECLARATION FOR PATENT APPLICATION

Docket No.70140

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: *SHIELDING DEVICE FOR CONNECTION STRIPS IN TELECOMMUNICATIONS AND DATA ENGINEERING*

the specification of which

(Check one) [ ] is attached hereto.
[X] was filed as PCT international application
Number PCT/EP99/07756
on October 14, 1999
and was amended under PCT Article 19
on _____

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, 119 (a)-(d) or 365 (b) of any foreign application(s) for patent or inventor's certificate or 365 (a) of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date or any PCT international application(s) designating at least one country other than the United States of America by me on the same subject matter having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed
DE 198 53 837.5	Germany	23/Nov./1998	Yes
(Number)	(Country)	(Day/Month/Year filed)	

(Number)	(Country)	(Day/Month/Year filed)
(Number)	(Country)	(Day/Month/Year filed)

I hereby claim the benefit under Title 35, United States Code, 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code 112. I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No)	(Filing Date)	(Patented, Pending, Abandoned)
(Application Serial No)	(Filing Date)	(Patented, Pending, Abandoned)

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: **John J. McGlew, Reg. 17,722; and/or John James McGlew, Reg. 31,903; and/or Hilda S. McGlew Reg. 30,295; and/or Theobald Dengler, Reg. 34,575; and/or Clario Ceccon, Reg. 19,268; and/or Kristina M. Grasso Reg. 39,205.**

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Full name of fourth inventor _____

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Residence _____ Citizenship _____
Post Office Address _____

Full name of fifth inventor _____

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Full name of sixth inventor _____

→Inventor's signature _____ →Date _____
Residence _____ Citizenship _____
Post Office Address _____

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